

the evolution of the angiospermous flower was a process of reduction. There is thus no longer any presumption that the simplest forms among the flowers of angiosperms are likely to be the most primitive. The tendency of the older morphologists to regard such flowers as reductions from a more perfect type appears fully justified by the discovery of the elaboration of floral structure attained by the Mesozoic Cycadophyta before the advent of the angiosperms themselves.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The special board for biology and geology has approved a grant of 150*l.* from the Balfour fund made by the Balfour managers to W. E. Agar, of King's College, in furtherance of his proposed expedition to the Paraguayan Chaco.

The board of agricultural studies reports that the fund for providing the department of agriculture with a permanent building of its own has received substantial additions during the year, the conditional contribution of 5000*l.* by the Drapers' Company having been secured. The fund now amounts to 13,030*l.* 10*s.*

MANCHESTER.—Mr. F. T. Swanwick, Richardson lecturer in mathematics, has been appointed Fielden lecturer in mathematics in place of Mr. R. F. Gwyther, who is now devoting his whole time to the joint matriculation board of the northern universities. E. Littlewood (Cambridge) has been appointed Richardson lecturer in mathematics; he was elected senior wrangler in 1905, and was placed in the first division of the first class of part ii. of the mathematical tripos in 1906. Mr. H. M. Priestley (Cambridge) has been appointed assistant lecturer in mathematics; he was fifth wrangler in 1905, and was placed in the second division of the first class of part ii. of the mathematical tripos in 1906.

Plans have been prepared for new engineering laboratories, and building will shortly be commenced on a site on the north side of Coupland Street, near the present physical laboratories. For some time past need has been felt for this extension, and the new buildings will afford ample space for the whole work of the engineering department to be carried out under one roof. In addition to the main laboratory of 75 feet by 166 feet, lecture rooms, a large drawing room, and a boiler house are to be erected.

SIR ARTHUR RÜCKER, F.R.S., principal of the University of London, will distribute the prizes to the successful students at Guy's Hospital on Thursday, July 4.

SIR JOHN KENNAWAY, BART., M.P., will preside at the commemoration day proceedings of Livingstone College, Leyton, E., on Wednesday, June 5. Livingstone College exists for the purpose of solving one of the greatest problems connected with missionary effort, viz. the preservation of the health of missionaries and others in tropical climates.

It is stated in *Engineering* of May 24 that the Technikum at Ilmenau, in Thuringia, is one of the few technical schools that are conducted in direct connection with commercial works. The director is also head of a firm of engineering and electrical works, and the students are, at all times, when not occupied by their regular lectures and laboratory practice, admitted into the works, in which advanced pupils can receive further training. The combination seems to answer.

In the *Engineering Magazine* (vol. xxxiii., No. 2) Mr. H. Cole Estep discusses the attitude of technical students towards the engineering-apprenticeship courses which are offered by the leading manufacturers of the United States. He finds the attitude unsympathetic. The present low flat-rate system of wages is discouraging rather than encouraging to the average college student. The objections are also raised that the courses are too long, that there is no reward at the end, and that the invention clause existing in many apprenticeship contracts is unfair.

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A COURSE of instruction in natural history has been arranged at the Horticultural College, Swanley, for students who, having passed through the ordinary training in gardening, wish for additional training in natural-history subjects, in order to qualify as teachers of gardening and nature-study. Other students will be admitted to the course provided they can show they are able to take full advantage of the instruction. Students will be given an insight into field work in natural history based on laboratory instruction; the work will be practical, and students will be shown how to prepare their own material and to construct their own apparatus. The course will last a year, of which the first two terms will be devoted to general work in botany, zoology, and geology, and the third term to special subjects. Fuller particulars may be obtained from the principal at the college, Swanley, Kent.

In his presidential address to the Royal Geographical Society on Monday, May 27, Sir George Goldie again directed attention to the omission of geography in examinations for the Foreign Office and other branches of the Civil Service. For a good many years the Foreign Office stood in an exceptional position amongst the Civil Services of the Crown by including geography amongst the subjects for the entrance examinations of candidates and making a pass in this subject compulsory. After next month, however, geography will cease to be a subject which candidates for the Foreign Office may select even voluntarily. So many sons of the well-to-do classes of this country compete in examinations controlled by the Civil Service Commissioners that the standing in the whole educational sphere of any subject depends to some extent upon whether it is or is not a means of gaining marks in the civil and military examinations, and it may be asserted that if geography is included as one of the subjects of examination, it will very shortly take its place in Great Britain, as it has long since done in the United States, Germany, and other countries, as one of the fundamental and indispensable elements in the education of childhood and youth. That this has not been the case up to now is probably due to the unintelligent and unmethodical manner in which the subject was taught until a few years ago, with the result that the majority of those who are to-day in a position to speak with authority retain an entirely incorrect impression of its scope and objects. It is to the University of Oxford, supported, Sir George Goldie added, by the Universities of Cambridge, London, Edinburgh, and other great centres of education, that geographers must look for a satisfactory solution of this important question; for, so far as can be gathered from the correspondence on the subject which appeared some months ago, the Civil Service Commissioners are willing to consider the admission of geography as one of the voluntary subjects for examinations, provided the great universities will give a lead. In taking such a step, both the universities and the commissioners would have behind them the pressure of public opinion, owing to the sudden awakening both of interest in the Empire as a whole and of recognition of our widespread ignorance of its geographical conditions.

### SOCIETIES AND ACADEMIES.

#### LONDON.

Royal Society, January 31.—“On the Thermo-chemistry of Flame Spectra at High Temperatures.” By Prof. W. N. Hartley, F.R.S.

(1) The oxides of calcium, strontium, and barium are not dissociated by heat alone, because they show no spectrum in a carbon monoxide flame; (2) they are reduced by the combined action of heat and hydrogen in the oxy-hydrogen flame and by the action of cyanogen in the cyanogen flame; (3) the flame coloration is due to the metal, because not only is the flame spectrum from lime essentially the same as that of the metal calcium, but also the heats of formation of CaO, SrO, and BaO have very nearly the same value, and that where calcium oxide can be reduced the other oxides could, on that account, undergo a similar reduction. Whether the compound of strontium or barium in the flame be a sulphide or an oxide, the same spectrum is emitted, but there is some

uncertainty as to whether the barium sulphide is not converted into oxide by water-vapour in the flame.

The explanation given by Lenard, of the flame coloration by the alkali salts, appears to be inapplicable to the coloration of the carbon monoxide flame by the haloid salts of the alkaline earth metals.

February 21.—“Longitudinal Symmetry in Phanerogamia.” By Percy Groom. Communicated by Dr. D. H. Scott, F.R.S.

The paper describes a graphic method of recording the longitudinal distances apart of plant members, and gives results obtained by the method, which is as follows:—

On squared paper the successive internodes (or other segments) are recorded as successive ordinates, and the resultant curve is termed the internode curve (or other curve).

In a typical herb the internode curve of the main axis is a regular ascending-descending one, while those of the successive branches commencing at the base of the herb more or less completely and gradually change from this complete curve to a purely descending one. These internode curves are shown to be inherent, though liable to modification by external conditions.

In alternate-leaved *Chenopodiaceæ* the internode curve invariably shows a periodic zigzag form, and, by connecting the alternate ordinates, can be analysed into two “subcurves” which are frequently not synchronous in period. Both these subcurves of the main axis are of the ascending-descending type, while those of the successive branches traced from below more or less change into the purely descending form. Of the two subcurves, one is the “internode subcurve” and the other is the “displacement subcurve.” Evidence is given in favour of the view that the original phyllotaxis of the *Chenopodiaceæ* was opposite, that the internode subcurve represents a modification of the original internode curve, and that the displacement subcurve represents a series of intercalated segments registering the distances up which single leaves have been displaced from the original opposite arrangement.

This view is confirmed by the fact that a similar displacement curve is formed by recording the heights of the successive branches above their subtending leaves in certain *Boraginaceæ*. It is shown, too, that the *Boraginaceæ* are probably opposite leaved in design, and that in *Solanum Dulcamara* the familiar leaf displacements high up the stem are foreshadowed by others lower down.

One point of significance in connection with these assumed hereditary displacements is that they follow the rule formulated by de Vries in reference to the dimensions and distribution of monstrosities.

The paper also discusses smaller or more fluctuating displacements of leaves; double-leaves; the correlation of alternate rather than successive internodes and nodes where phyllotaxis is cyclic; and the theory of stem structure.

Finally, the applicability of the method to other morphological problems is tested by observations on sympodes, with a positive result in the case of *Ampelopsis hederacea*.

March 14.—“Capillary Electrometer Records of the Electrical Changes during the Natural Beat of the Frog’s Heart.” By Prof. Francis Gotch, F.R.S.

The chief points brought forward in this communication are the following:—(1) The electrical changes during the natural rhythmic activity of the frog’s heart, when kept *in situ* and supplied with blood, resemble in all essentials those observed by Waller, Starling, Bayliss, Einthoven, &c., in the mammalian heart, but do not correspond with those observed by Engelmann, Burdon-Sanderson, &c., in the excised frog’s heart artificially excited. (2) The more prolonged character of the activity of the frog’s heart, and the ease with which the locality of any change can be determined, render it clear that the special feature of the natural beat is the occurrence of two chief electrical changes of similar sign. (3) This is explicable as due to the first or base change being more prolonged and of greater magnitude than the apex change. (4) The increased duration and magnitude of the base change is mainly caused by the circumstance that, although the base change occurs first, the whole of the base is not involved, the portion around the spring of the aorta remaining

quiescent until the activity has occurred at the apex; this aortic portion then becoming active produces the terminal effect. (5) Each contraction wave thus starting at the auriculo-ventricular junction is propagated to the apex, and returns from the apex to the part of the base around the start of the aorta; from this it spreads to the aortic bulb; at 15° C. the propagation rate is about 130 mm. in one second, i.e. 6/100” after the first base change, an apex change is perceptible, and 6/100” after the apex, a second aortic base change. (6) The return wave is brought into prominence when the heart is distended with blood, or has been so distended, and is associated with the persistence of the early tubular condition which prevails in the heart of the tadpole. (7) The return wave reveals itself in the records as a double reversal of the electromotive condition of the whole base contact; this is at first galvanometrically negative (base activity), then suddenly positive (apex activity), and then, again, suddenly negative (second aortic part of base activity). It is confirmed by records made under a variety of conditions, comprising local alterations of temperature, local injury, and altered position of electrometer contacts. All the records were those of the displacements of the capillary meniscus, photographed upon moving sensitised plates.

Entomological Society, May 1.—Mr. C. O. Waterhouse, president, in the chair.—*Exhibits*.—Coleoptera from Iceland: Mr. O. E. Janson exhibited a small collection of Coleoptera made by him in Iceland in July, 1906, comprising thirty-nine species, of which some were previously unrecorded as inhabiting that island. He also directed attention to the affinity between the beetle fauna of Iceland and of Scotland, only one of those taken, *Colymbetes groenlandicus*, Aubé, not occurring in both countries.—Larvæ of *Otiorrhynchus sulcatus*: Mr. J. A. Clark brought for exhibition living larvæ of *Otiorrhynchus sulcatus* feeding on the roots of ferns.—Coleoptera from the south of France: Commander J. J. Walker showed living specimens of *Oxythyrea stictica*, L., *Epicometis hirtella*, L., and *Anthaxia parallela*, taken by Dr. T. A. Chapman at St. Maxime, Var, S. France.—Mimetic relation of *Leuceronia argia*, ♀: Dr. F. A. Dixey exhibited specimens of seven different forms of the variable female of *Leuceronia argia*, Fabr., showing that each form stood in mimetic relation with a separate model. The models belonged to the genera *Belenois*, *Phrissura*, *Pinacopteryx*, and *Mylothris*, and the association was probably in every instance synaposematic.—Mimicry in Coleoptera: the President exhibited some Coleoptera collected in Pahang by Mr. H. C. Robinson, and recently received at the Natural History Museum.—Living luminous Coleoptera: Dr. G. B. Longstaff exhibited living specimens of the Elaterid *Pyrophorus noctilucus*, Linn., brought from Trinidad by Dr. F. L. J. M. de Verteuil, R.N.—*Quedius riparius* and *Trypodendron quercus*: Mr. H. St. J. Donisthorpe exhibited on behalf of Prof. T. Hudson Beare and himself specimens of *Quedius riparius*, Kell., and *Trypodendron quercus*, Eich., taken by them at Porlock, Somersetshire, on April 16 and 17. Also *Hydrovatus clypealis*, Shp., taken by them on April 14 at Worle, near Weston-super-Mare.—Dipteron associated with ants: Mr. Donisthorpe also showed the larva and pupa of a Dipteron of the genus *Microdon*, taken in a nest of *Formica fusca* at Porlock last month.—*Hemimerus talpoides*, Walk.: Mr. R. Shelford exhibited a specimen of the curious parasitic orthopterous insect *Hemimerus talpoides*, Walk., from Portuguese Guinea.—*Paper*.—A case of homeotic variation in a cockroach: R. Shelford.

Linnean Society, May 2.—Prof. W. A. Herdman, F.R.S., president, in the chair.—The respiratory mechanism in certain elasmobranchs: A. D. Darbishire. The author exhibited living examples of the dog-fish, ray, and angel-fish, and explained that the primary object of the investigation was to determine the question whether water went in, or was expelled from the spiracle of the dog-fish. The method employed to elucidate this point consisted in liberating from a pipette some powdered carmine suspended in sea-water in the immediate vicinity of the spiracle. The cloud of carmine was seen to be vigorously drawn in at each inspiring phase. A remarkable difference was discovered to exist between the respiratory mechanism in the



dog-fish and the ray on the one hand, and the angel-fish, *Rhina squatina*, on the other, for whilst in the case of the former two fish the gill-covers are purely passive agents in determining the respiratory current, in the case of *Rhina* the undulation of the gill-covers seemed to be solely responsible for the flow of water into the spiracle and mouth.—The common elements of the fauna and flora of Abyssinia and West Africa: Prof. E. B. **Poulton**. The author based his remarks on his observations of a group of African butterflies. The paper was illustrated by a series of lantern-slides and a large orographical map.—The fauna of the Sudanese Red Sea: Prof. W. A. **Herdman**. Four papers of a proposed series on this subject were laid before the society; they consisted of (1) an introduction, by the president; (2) a narrative of Mr. Cyril Crossland's explorations; (3) Mr. Crossland's account of the formation of certain shore-cliffs in Egypt; and (4) of the Red Sea coral reefs; with (5) Mr. E. R. Sykes's enumeration of the Polyplocophora collected.—Pseudo-scorpions: C. J. **With**. The specimens described all belong to the British Museum. They comprise in the Australasian group, under the family Cheliferidae, Hagen, four new species of the genus *Chelifer*, Geoffroy. In the Asiatic group three species of the same genus are re-described, one of them, which Pocock in 1900 referred to *C. javanus*, Thorell, being now named as a distinct species, *C. pococki*. A single species of *Chelifer* from Africa is the subject of comment, but notice is taken of the large additions to our knowledge of the *Chelifer* fauna in that continent recently made by Ellingsen. Under the family Garypidae, Hansen, a new species of *Garypus*, Koch, is described from the island of Grenada; a new species of *Olpium*, Koch, from St. Vincent; and another from Stewart Island, New Zealand. Further, a species from Funafuti, which Pocock in 1898 referred to *Olpium longiventer*, Keyserling, is here transferred to the genus *Garypinus*, Daday, as an independent species, *G. oceanicus*; and another species, from Kauai in the Sandwich Archipelago, assigned by Eugène Simon in 1900 to *Olpium longiventer*, now becomes *Garypinus mirabilis*, n.sp. An appendix reviews the species *Chiridium ferum*, Simon, fam. Cheliferidae, and *Ideoroncus cambridgei*, Koch, fam. Obisidae, chiefly with regard to peculiarities in the structure of the antennæ. The paper is accompanied by numerous illustrations, and contains many notes on distribution.

**Zoological Society**, May 7.—Mr. G. A. Boulenger, F.R.S., vice-president, in the chair.—Original drawings of *Spirochaeta anodontae* from the crystalline style and intestine of *Anodonta cygnea*: H. B. **Fantham**. This was the first record of the occurrence of this parasite in the British pond-mussel, though Keysseltz recorded probably the same organism from *Anodonta mutabilis* about a year ago, without giving its dimensions. The organism was found to be about 40  $\mu$  long and about 0.7  $\mu$  broad, with pointed ends and an undulating membrane. Its motion was most rapid, but seemed to be both spiral and vibratory.—The Cephalopoda of Zanzibar and East Africa collected by Mr. Cyril Crossland in 1901-2: Dr. W. E. **Hoyle**. The collection was not extensive either in point of individuals or species, and a large proportion were young individuals to which it was impossible to affix definite names in the present state of our knowledge. Five were identical with forms contained in a collection recently made by Prof. Herdman near Ceylon, whilst others occurred also in the Red Sea, thus showing a marked similarity in the cephalopod fauna of the whole of this region. Advantage had been taken by the presence of several specimens of *Sepioteuthis loliginiformis* to give a full description of that species. Some octopod embryos showed epidermal structures very similar to, if not identical with, those described by Chun as constituting a bristle coat in young octopods, and an account of these, as full as the material allowed, was given.—The mammals collected by Mr. M. P. Anderson during the Duke of Bedford's exploration of eastern Asia: O. **Thomas**. The present paper (the fifth of the series) gave an account of a collection from central Korea, just north and south of Seoul, the capital. Seventy-three specimens were dealt with, belonging to thirteen species, of which several were new, additional to those already discovered by Mr.

Anderson during a previous visit to the southern part of the peninsula.—Some new buildings in Continental zoological gardens, based upon recent visits to those of Stellingen, Hamburg, Berlin, Dresden, Breslau, Vienna, Budapest, Frankfurt-am-Main, Amsterdam, Düsseldorf, Rotterdam, and Antwerp: A. **Trevor-Battye**.

**Physical Society**, May 10.—Prof. J. Perry, F.R.S., president, in the chair.—Stereoscopy with long base-line illustrated on the screen: Dr. T. C. **Porter**. The use of a long base-line for telestereoscopy occurred to M. Selb, of Brussels, and in 1903 he obtained stereoscopic mountain photographs. The applications of the method for military, geographical, and meteorological purposes, although obvious, do not seem to have been used before, and the author discusses the possibilities of these applications.

#### PARIS.

**Academy of Sciences**, May 21.—M. A. Chauveau in the chair.—New determination of the metre in terms of lengths of luminous waves: R. **Benoit**, Ch. **Fabry**, and A. **Perot**. The length of the standard metre in terms of wave-lengths of the red ray of the spectrum of cadmium at 760 mm. pressure and 15° C. on the hydrogen scale was found as a mean of four series of experiments to be equal to 1,553,164.13  $\lambda$ , whence  $\lambda = 0.64384696 \mu$ . These four series were selected from seven series which together gave a mean of 1 metre = 1,553,163.99  $\lambda$  and  $\lambda = 0.64384702 \mu$ , but three of these seven series are to be omitted in calculating the absolute value. The authors point out, however, that the mean of the seven series agree in a remarkable manner with the value obtained at the International Bureau of Weights and Measures by Michelson, the originator of the idea, and M. Benoit in 1894, namely (after due correction),  $\lambda = 0.64384700 \mu$ . From the authors' results it is easy to see that if all standard metres were destroyed, a determination to within one ten-millionth of the actual value could easily be made.—The reduction of diketones by hydrogen in presence of reduced nickel: Paul **Sabatier** and A. **Mailhe**. Typical  $\alpha$ ,  $\beta$ -, and  $\gamma$ -ketones were studied. Diacetyl,  $\text{CH}_3\text{CO.CO.CH}_3$ , gives

$\text{CH}_3\text{CH(OH).CO.CH}_3$  and  $\text{CH}_3\text{CH(OH).CH(OH).CH}_3$  on reduction. Three-fourths or more of the acetyl-acetone tested split up according to the equation

$\text{CH}_3\text{CO.CH}_2\text{CO.CH}_3 + \text{H}_2 = \text{CH}_3\text{CHO} + \text{CH}_3\text{CO.CH}_3$ , while acetyl-acetone,  $\text{CH}_3\text{CO.CH}_2\text{CH}_2\text{CO.CH}_3$ , gave chiefly oxyhexane 2-5,  $\text{CH}_3\text{CH.CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$ . The

authors are to continue similar work with the quinones.—Observations of the sun made at the Observatory of Lyons during the first quarter of 1907: J. **Guyllaume**. Tables are given of the distribution of spots and faculae as regards latitude.—The variation of double integrals: M. **Hadamard**.—Continuous, infinite, and simple groups of transformations (mathematical analysis): E. **Cartan**.—The surfaces produced by a circular helix: M. **Barré**.—The absolute sensibility of the ear: Henri **Abraham**. The sensibility of the ear was determined in absolute value by producing in it variations of pressure of known amplitude. The variations of pressure were produced in a cylinder of known volume by the vibrations of the membrane of a telephone, which formed one of the bases of the cylindrical cavity. The other base of the cylinder was also closed, except in the centre, where an opening connected with a bell-shaped orifice, which could be applied against the ear, was arranged. The results obtained seem to show that the limit of the sensations of the normal ear corresponds to variations of pressure having a magnitude of four ten-millionths of a millimetre of mercury. The author points out that his results agree approximately with those of Max Wien, who measured variations of pressure in Helmholtz resonators, but that they do not agree—being much smaller—with the values of different authors, who have used methods analogous to that indicated some time ago by Lord Rayleigh.—The ultimate lines of metals in dissociation spectra: A. **de Gramont**. A summary of the lines which may be regarded as specially characteristic for a number of common metals is given, and it is indicated that the lines termed ultimate by the author are the same

in the condenser-spark, in the ordinary spark discharge without condenser, in the electric arc, and in very hot flames.—Application of Trouton's law to the determination of molecular rise of boiling point of solutions: D. E. **Tsakalotos**.—Explosive mixtures of air and ether: J. **Meunier**. The lower limit of inflammability is about 58 to 60 milligrams of ether per litre of air, and the upper limit is about 200 milligrams. From 100 to 175 milligrams per litre it is more or less explosive.—The removal of water from alcohol by the catalytic action of red phosphorus and the phosphates: J. B. **Senderens**.—The action of magnesium amalgam on the aldehydes: André **Kling** and Paul **Roy**. Certain compounds such as polymerised formaldehyde (trioxymethylene) and chloral do not react, but others, e.g. acetic and benzoic aldehydes, react readily.—The double compounds of aluminium sulphide with the protosulphides of chromium, nickel, cobalt, and magnesium: Marcel **Houdard**.  $Al_2S_3MnS$ ,  $Al_2S_3FeS$ , and  $Al_2S_3CrS$  were isolated and analysed. They are considered to be similar to spinels in crystalline form and structure.—The dissociation of silicates of lithium: Edgar **Derome**.—Study of the calcium salt of paraoxybenzoic acid: **Ochsner de Coninck**.—The products formed by the condensation of ethyl oxalate with dimethylaniline in presence of aluminium chloride: A. **Guyot**.—Synthesis of ketones of the hexahydroaromatic series: G. **Darzens** (cf. *Comptes rendus*, vol. cxlii., p. 714).—Metallic thiosulphocarbamates: preparation of sulphocarbimides of the fatty series: Marcel **Delépine**.—The respiration of the vegetative aerial organs of vascular plants: G. **Nicolas**. The author summarises his results as follows:—(1) the different aerial organs of vascular plants have each their own intensity and special respiratory quotient; (2) the stalk and the petiole have generally intensities and respiratory quotients similar to each other; (3) of all aerial organs, those which are essentially charged with the assimilatory function are those which have the greatest respiratory intensity and the lowest respiratory quotient.—Properties of the pigments of batrachians: A. **Magnan**. The properties, including solubility, of green, yellow, brownish-yellow, red, and black pigments are described.—The reaction of the tissue of the iris to light: A. **Nepveu**. The iris is irritable to light in cephalopods, fish, and birds, but not in mammals.

## DIARY OF SOCIETIES.

THURSDAY, MAY 30.

ROYAL SOCIETY, at 4.30.—The Solubility of Air in Fats, and its Relation to Caisson Disease: Dr. H. M. Vernon.—Mitosis in Proliferating Epithelium: Dr. J. O. Wakelin Barratt.—An Experimental Inquiry into the Nature of the Substances in Serum which Influence Phagocytosis: Dr. G. Dean.—The Correlation of Ovarian and Uterine Functions: E. S. Carmichael and Dr. F. H. A. Marshall.—Report of Private Expedition to Philippeville, Algeria, to view the Total Solar Eclipse, August 30, 1905: Dr. T. C. Porter and W. P. Colfox.

ROYAL INSTITUTION, at 3.—Chemical Progress—Work of Berthelot, Mendeleëff, and Moissan: Sir James Dewar, F.R.S.  
SOCIETY OF ARTS, at 4.30.—Irrigation Colonies in India: Laurence Robertson.

FRIDAY, MAY 31.

ROYAL INSTITUTION, at 9.—Recent Journey Across Africa: A. Henry Savage Landor.

SATURDAY, JUNE 1.

ROYAL INSTITUTION, at 3.—The Contest between Guns and Armour: Sir William H. White, K.C.B., F.R.S.

MONDAY, JUNE 3.

SOCIETY OF CHEMICAL INDUSTRY, at 8.—The Nature of, and Changes involved in the Production and Setting of Plaster of Paris: W. A. Davis.—The Analysis of White Lead: W. A. Davis and C. A. Klein.—A Calorimeter for Volatile Liquid Fuels, specially adapted for Petrol: W. Hansen Rawles.—Influence of Temperature of Dyeing on Resolution: W. P. Dreaper and A. Wilson.—The Loss of Nitre in the Chamber Process, Part iii.: J. K. H. Inglis.

INSTITUTE OF ACTUARIES, at 5.—Annual General Meeting.

TUESDAY, JUNE 4.

ROYAL INSTITUTION, at 3.—Malaria, Sleeping Sickness, Tick Fever, and Allied Diseases: Prof. G. F. Nuttall, F.R.S.

WEDNESDAY, JUNE 5.

ENTOMOLOGICAL SOCIETY, at 8.—Bionomic Notes on some South African Insects: Dr. G. B. Longstaff and Dr. F. A. Dixey.

GEOLOGICAL SOCIETY, at 8.—Brachiopod Morphology: Cincta, Eudesia, and the Development of Ribs: S. S. Buckman.—A Marine Fauna in the Basement-beds of the Bristol Coalfield: Herbert Bolton.

SOCIETY OF PUBLIC ANALYSTS, at 8.—Note on Horse Fat and "Animal" Oil: H. Dunlop.—A Method for Determining Caustic Lime in Fertilisers: J. Hendrick.—The Rapid Estimation of Total Solids in Milks: C. Revis.—The Reducing Action of Hydrogen, iii., The Reduction of Molybdic and Vanadic Acids: A. C. Chapman and H. D. Law.

THURSDAY, JUNE 6.

ROYAL SOCIETY, at 4.30.—Probable Papers: On the Two Modes of Condensation of Water Vapour on Glass Surfaces, and their Analogy with James Thomson's Curve of Transition from Gas to Liquid: Prof. F. T. Trouton, F.R.S.—The Mechanical Effect of Canal Rays: A. A. Campbell Swinton.—The Distribution of the Blue and Violet Light in the Corona on August 30, 1905, as derived from Photographs taken at Kala-e-Senam, Tunis: Prof. L. Becker.—On the Velocity of Rotation of the Electric Discharge in Gases at Low Pressures in a Radial Magnetic Field: Prof. H. A. Wilson, F.R.S., and G. H. Martyn.—The Osmotic Pressure of Compressible Solutions of any Degree of Concentration: A. W. Porter.

LINNEAN SOCIETY, at 8.—Contributions to our Knowledge of the New Zealand Holothurians: Prof. A. Dendy and E. Hindle.—Observations on Australasian Polyclads: Prof. W. A. Haswell.—Report on the Marine Fishes collected by Mr. J. Stanley Gardiner in the Indian Ocean: C. Tate Regan.—The Lithothamnium of the *Sealark* Expedition: M. Foslée. Notes sur les Ixodidae recueillis dans les îles de l'Océan Indien, par M. J. Stanley Gardiner: Prof. L. G. Neumann.—Exhibitions: *Orobanchae Ritro*, and some New Varieties of Plants from the Channe Islands: G. Claridge Druce.

ROYAL INSTITUTION, at 3.—Chemical Progress—Works of Berthelot, Mendeleëff, and Moissan: Sir James Dewar, F.R.S.

CHEMICAL SOCIETY, at 8.30.—The Relation between Absorption Spectra and Chemical Constitution, Part vii., Pyridine and some of its Derivatives: F. Baker and E. C. C. Baly.—The Interaction of Methylene Chloride and the Sodium Derivative of Ethyl Malonate: F. Tuin.—Molecular Weight of  $\beta$ -Naphthol in Solution in Solid Naphthalene: E. P. Perman and J. H. Davies.—Synthesis of Hexatriene Derivatives, Preliminary Notice: I. Smedley.—The Constitution of the Diazo-Compounds: J. C. Cain.— $\beta$ -Cresol Sulphoxide and Sulphide: S. Smiles and T. P. Hilditch.— $\beta$ -Dioxiphenylsulphoxide: S. Smiles and A. W. Bain.—Coloured Azo-derivatives of 1:3-Diphenylbarbituric Acid. Dynamic Isomerism among the Hydrazones of 1:3-Diphenylalloxan: M. A. Whiteley.—Dibromoaminoazobenzene: J. T. Hewitt and N. Walker.

FRIDAY, JUNE 7.

ROYAL INSTITUTION, at 9.—Studies in High Vacua and Helium at Low Temperatures: Sir James Dewar, F.R.S.

GEOLOGISTS' ASSOCIATION, at 8.—The Chalk of Surrey, Part ii., The Western Area: G. W. Young.

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